

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : NEC CORP

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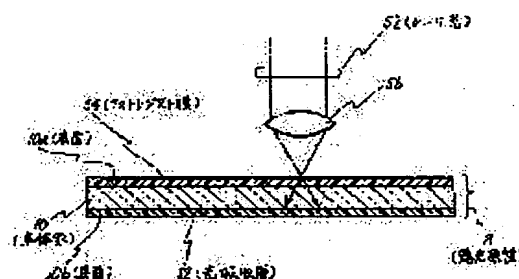
(72)Inventor : OMURA NAOKI

1) EXPOSURE MASTER DISK FOR OPTICAL DISK MASTERING

)Abstract:

PROPOSE: To improve contrast at the time of exposing a photoresist film with a laser beam.

INSTITUTION: An exposure master disk 8 is provided with a main body part 10 consisting of a glass material, the photoresist film 54 which is added on a surface 10a of the main body part 10 and exposed by a laser beam 52 and a light absorbing film 12 which is cladded on a rear 10b of the main body part 10 and absorbs the laser beam 52. The laser beam 52 passes through the photoresist film 54 of the surface 10a of the main body part 10, then a part of it transmits the main body part 10a and reaches the light absorbing film 12. The light absorbing film 12 absorbs the laser beam 52 transmitting the main body part 10. Therefore, a reflection of the laser beam 52 transmitting the main body part 10 at the rear 10b of the main body part 10 and a reincidence of the laser beam 52 after transmitting the rear 10b of the main body part 10 are prevented.



LEGAL STATUS

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AIMS

aim(s)]

aim 1] Exposure original recording for optical disk mastering characterized by having the light absorption film which
absorbs said laser beam in the exposure original recording for optical disk mastering equipped with the body section
which consists of the glass quality of the material, and the photoresist film exposed by the laser beam while the front
face of this body section is covered while the rear face of said body section is covered.

aim 2] Exposure original recording for optical disk mastering characterized by having the light-and-heat absorption
film which absorbs said laser beam and heat in the exposure original recording for optical disk mastering equipped with
the body section which consists of the glass quality of the material, and the photoresist film exposed by the laser beam
while the front face of this body section is covered while the rear face of said body section is covered.

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TAILED DESCRIPTION

[Detailed Description of the Invention]

[01]

[Industrial Application] This invention relates to the exposure original recording for optical disk mastering for producing the nickel stamper used as the original recording at the time of carrying out extensive reproduction of the optical disk (only henceforth "exposure original recording").

[02]

[Description of the Prior Art] Drawing 2 is the sectional view showing the conventional exposure original recording.

[03] The exposure original recording 48 is equipped with the body section 50 which consists of the glass quality of material, and the photoresist film 54 exposed by the laser beam 52 while surface 50a of the body section 50 is covered. The photoresist film 54 is applied to surface 50a of the body section 50 by the thickness of dozens to hundreds nm. And pit exposure is carried out by the laser beam 52 of the near-ultraviolet region extracted with the condenser lens 56 with the high numerical aperture NA in the photoresist film 54, and the pattern after development is formed.

[04]

[Problem(s) to be Solved by the Invention] However, it is reflected by rear-face 50b of the body section 50, and a part of the laser beam 52 which penetrated the photoresist film 54 turns into the multiplex interference light 58, and it may expose unexposed sections 54c and 54d of the photoresist film 54 (the halation effectiveness). Moreover, a part of laser beam 52 which penetrated rear-face 50b of the body section 50 reflects on the turntable (not shown) which puts the exposure original recording 48, and it may carry out incidence from rear-face 50b of the body section 50 again. In this case, the pattern reflecting the configuration of a turntable will be exposed by the photoresist film 54.

[05] Thus, there were the following problems in the conventional exposure original recording 48. That is, the bad pattern of contrast will be formed as a result. The fall of contrast becomes remarkable in case especially the pattern of high density is exposed.

[06]

[Objects of the Invention] Then, the purpose of this invention is to offer the exposure original recording which raised contrast at the time of exposing the photoresist film by the laser beam.

[07]

[Means for Solving the Problem] This invention is made in order to attain the above-mentioned purpose, and it improves exposure original recording equipped with the body section which consists of the glass quality of the material, and photoresist film exposed by the laser beam while the front face of this body section is covered.

[08] The improved point is having had the light absorption film which absorbs said laser beam while being put on the rear face of said body section. Moreover, it is good also as what was equipped with the light-and-heat absorption film which absorbs said laser beam and heat instead of this light absorption film.

[09]

[Action] The part penetrates the inside of the body section, and a laser beam reaches the light absorption film on the rear face of the body section, after exposing the photoresist film of a body section front face. This light absorption film absorbs the laser beam which penetrated the inside of the body section. Therefore, it is suppressed that reflect with the body section rear face, or the laser beam which penetrated the inside of the body section penetrates a body section rear face, and carries out incidence again.

[10]

[Example] Drawing 1 is the sectional view showing one example of the exposure original recording concerning this invention. Hereafter, this example is explained based on this drawing. However, the same sign is given to the same part in drawing 2, and explanation is omitted. In addition, the photoresist film 54 and the light absorption film 12 are

anded and shown compared with the body section 10 on account of illustration.

[11] The exposure original recording 8 concerning this invention is equipped with the body section 10 which consists of the glass quality of the material, the photoresist film 54 exposed by the laser beam 52 while surface 10a of the body section 10 is covered, and the light absorption film 12 which absorbs a laser beam 52 while rear-face 10b of the body section 10 is covered.

[12] The glass base [finishing / washing] by Hoya Corp. was used for the body section 10. The light absorption film was formed by applying uniformly the coating which contains a graphite in rear-face 10b of the body section 10 by a thickness of 10nm or more. the coating containing this graphite -- 300nm of wavelength regions from -- 500nm up to the rate of the absorption of light to a laser beam 52 is a certain thing 60% or more. the photoresist film 54 -- surface of the body section 10 -- positive type photoresist by the SHIPURE Far East company 9600 series or Tokyo -- corporation -- incorporated company positive type photoresist TSMR8800 series -- the spin applying method -- 100nm spin spreading was carried out and it formed by annealing in nitrogen-gas-atmosphere oven.

[13] This exposure original recording 8 was exposed with the MRY[by Japan Laser Corp.]-1MCN optical disk recorder. Consequently, the laser beam 52 which was extracted with the condenser lens 56 and penetrated the body section 10 was fully absorbed by the light absorption film 12. Therefore, the striped pattern reflecting the configuration of the turntable conventionally produced on the photoresist film 54 was able to be lost, halation was also able to be reduced, and the good pattern of contrast was able to be formed.

[14] In addition, since the coating containing the graphite as light absorption film 12 also has the property which absorbs heat, it functions also as light-and-heat absorption film. In this case, the effect of heat at the time of exposing the photoresist film by the laser beam is mitigable.

[15] Effect of the Invention] According to the exposure original recording concerning this invention, since the light absorption film was made to put on a body section rear face, the laser beam which penetrated the inside of the body section is absorbable with the light absorption film. Therefore, the contrast at the time of exposing the photoresist film by the laser beam can be improved by the ability preventing that reflect with the body section rear face, or the laser beam which penetrated the inside of the body section penetrates a body section rear face, and carries out incidence without reflection.

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AWINGS

Figure 1]

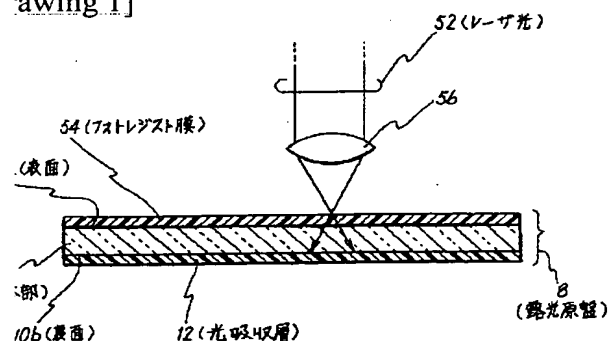
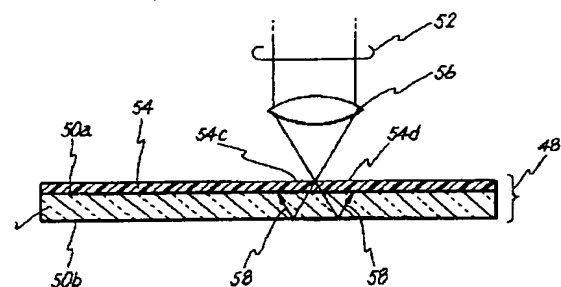


Figure 2]



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PATENT ABSTRACTS OF JAPAN

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(71)Applicant : MATSUSHITA ELECTRIC IND CO LTD

)Date of filing : 29.05.2000

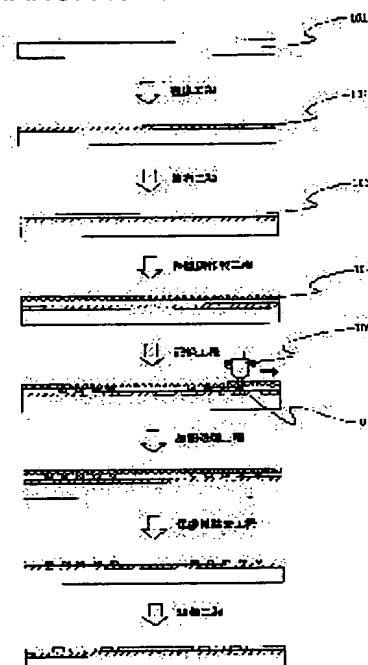
(72)Inventor : ABE SHINYA

1) INFORMATION RECORDING MEDIUM MASTER DISK AND METHOD FOR MANUFACTURING THE SAME

)Abstract:

PROBLEM TO BE SOLVED: To provide a stable method for manufacturing master disk by which deactivation of a photoresist by intrusion of a base material is suppressed even when a substrate containing a base material is used in the method for the manufacture of an information recording medium which uses a chemically amplifying photoresist.

SOLUTION: A non-basic and almost transparent barrier layer 102 which prevents intrusion of a base material is formed between the substrate containing a base and the chemically amplifying photoresist film used as a photosensitive material so as to isolate the photoresist film 103 from fusion of the base material in the substrate.



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AIMS

aim(s)]

aim 1] Information record-medium original recording by which the laminating of the non-basicity ingredient film is carried out, and the desired pattern was formed with chemistry magnification mold photoresist resin on said non-basicity ingredient film on the base material.

aim 2] Information record-medium original recording according to claim 1 characterized by a base material being an alkali soluble ingredient or soda glass.

aim 3] Information record-medium original recording according to claim 1 to which a non-basicity ingredient is characterized by being a silicon dioxide.

aim 4] Information record-medium original recording according to claim 1 to which a non-basicity ingredient is characterized by being an aluminum oxide.

aim 5] Information record-medium original recording according to claim 1 to which a non-basicity ingredient is characterized by being the organic polymer of nonaqueous solubility.

aim 6] The information record-medium original-recording production approach of becoming from the film-formation process which forms the film of a non-basicity ingredient on a substrate, the spreading process which applies to carry out stoving of the chemistry magnification mold photoresist as a photosensitive ingredient, the record process which embraces the signal with which wavelength should record record light 300 nm or less, become irregular or deviate, to carry out condensing exposure, heating down stream processing after exposure, and the development process to develop negatives in said chemistry magnification mold photoresist, and form a desired pattern.

aim 7] The information record-medium original recording production approach according to claim 6 that a non-basicity ingredient is characterized by being abbreviation transparency to the wavelength of record light.

aim 8] the wavelength of after a spreading process and record light -- receiving -- abbreviation -- the information record-medium original recording production approach according to claim 6 characterized by performing a development process after performing the protective coat production process which forms a water-soluble transparent ingredient by a thickness of 300nm or less and performing a record process and the protective coat removal process that a neutral developer solution removes a water-soluble ingredient after heating down stream processing.

aim 9] The information record-medium original recording production approach according to claim 8 that a water-soluble ingredient is characterized by being an organic polymer.

aim 10] The information record-medium original recording production approach according to claim 8 characterized by heat-treating between the spreading process of a water-soluble ingredient, and a record process.

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TAILED DESCRIPTION

Tailed Description of the Invention]

01]

Field of the Invention] This invention relates to the production approach using a chemistry magnification mold photoresist as a photosensitive ingredient especially about the production approach of original recording for information record media, such as an optical disk.

02]

Description of the Prior Art] Although an optical disk is general with the spread of compact disks (CD), researches and developments of a higher-density optical disk are done briskly, and DVD still higher-density than CD is proposed and in practical use in recent years. Development of the further high density optical disk for recording the signal for which the large capacity of a high definition television will be needed from now on on high density is desired. For that purpose, the production technique of the high-density information record-medium original recording which can perform more detailed record is very important.

03] The spreading process which the conventional information record-medium original recording applies to the soda glass base material 201 the photoresist which used novolak resin as the principal component with a spin coat method as shown in drawing 2, and forms the photoresist film 202, Blue glow (for example, wavelength of 458nm), or near ultraviolet ray light (for example, wavelength of 351nm) It becomes irregular or deviates according to the signal which should be recorded, and is produced by the record process condensed and exposed with an objective lens 203, and the development process which forms the pattern called a pit by developing negatives after that and removing the exposure portion 204, and a slot.

04] In order to raise recording density, it is necessary to form a smaller pit and a narrow slot. For example, in DVD having the capacity of 4.7GB, the magnitude of the minimum pit is about 0.3 micrometers in the length of 0.4 micrometers, and width of face, and in order to attain the capacity of about 25GB, it needs to form the length of 0.18 micrometers, and an about [width-of-face 0.15micrometer] pit. In order for the magnitude of the pit formed to form a smaller pit depending on the diameter of a condensing spot of record light, the smaller diameter of a condensing spot is needed.

05] Generally, the diameter of a condensing spot is proportional to the wavelength of record light, and in inverse proportion to numerical aperture. However, if it says about numerical aperture, it is difficult to already have condensed using 0.9 or more objective lenses from the former, and to enlarge this further. Then, the attempt which makes the diameter of a condensing spot small by short wavelength-ization is made, using far-ultraviolet-rays light with wavelength shorter than 300nm as a record light.

06]

Problem(s) to be Solved by the Invention] However, since this wavelength region shows big absorption, light energy is transformed into heat energy by absorption rather than the sensitization process which should happen essentially, a development up is carried out, the process in which it deteriorates occupies dominance and the function as a photoresist lost, application in this wavelength region is difficult for the photoresist which uses as a principal component the novolak resin used from the former.

07] Then, application of the chemistry magnification mold photoresist which uses as a principal component the polyvinyl phenol (PVP) currently prepared for the excimer lasers of far ultraviolet rays, polymethylmethacrylate (PMMA), etc. is tried. However, although the solubilization reaction to an alkaline developer advances according to the enormous energy with which the conventional novolak resin photoresist was exposed, the proton (acid) generated with the exposed luminous energy serves as a catalyst, the solubilization to an alkaline developer is promoted by BEKU after exposure, and the configuration after final development is decided by the chemistry magnification mold photoresist by

- 08] Therefore, the trap of the proton generated when the base object invaded is canceled out by neutralization, it activates, and the function as a catalyst is not accomplished, but it has the same effectiveness, and the configuration formed in development changes as the sensibility of a photoresist changed as a result. Therefore, since itself contains a base object, the soda glass conventionally used for the base material becomes the cause of it being spread in a photoresist and causing deactivation of a proton similarly, when applying directly. Moreover, management of the base object concentration which exists in an ambient atmosphere is needed.
- 09] Moreover, from inner circumference, since exposure performs one by one toward inner circumference from a periphery or a periphery, it occurs [time difference] at the start edge and termination of exposure. A sensibility change meantime poses a big problem as original recording of an information record medium in order to cause an uniformity in the configuration after development.
- 10] Then, even if conventional cheap soda glass is used for the purpose of this invention as a base material, it is intercepting the base object which carries out diffusion invasion from a base material to a chemistry magnification mold photoresist, preventing deactivation of a photoresist, and offering the approach which is stabilized and produces information record-medium original recording.
- 11] Means for Solving the Problem] Even if the information record-medium original recording production approach of this invention is a base material containing a base object, it is preparing the layer of the non-basicity ingredient which intercepts diffusion invasion of a base object between a base material and the chemistry magnification mold photoresist used as a photosensitive ingredient, and a base object invades from a base material and it can prevent causing deactivation of a chemistry magnification mold photoresist. Moreover, the effectiveness that forming the protective coat of a non-basicity ingredient in a photoresist film front face also prevents the base object in an ambient atmosphere invading into a photoresist, and it prevents deactivation is acquired. In addition, a non-basicity ingredient here means an ingredient which the photoresist film is not made to diffuse a base object, and reacts with a photoresist and thinner, and does not generate a base object.
- 12] Embodiment of the Invention] Hereafter, the gestalt of the operation in the information record-medium original recording production approach of this invention is explained, referring to a drawing.
- 13] Drawing 1 is a schematic diagram explaining the information record-medium original recording production approach in the gestalt of operation of this invention. The transparency isolation layer 102 which consists of a silicon oxide by chemical vapor deposition (CVD method) is first formed as a film production process on the soda glass base material 101 which finished surface washing. As a spreading process, a PVP system chemistry magnification mold photoresist is applied with a spin coat method, is heated, thinner is evaporated enough, and the photoresist film 103 is formed by the thickness of 70nm of abbreviation.
- 14] As a protective coat production process, the water-soluble polyvinyl system polymer (for example, TOKYO INKA KOGYO TSP-5A) which is a non-basicity ingredient is applied with a spin coat method, it is made to dry and a protective coat 104 is formed. This water-soluble polyvinyl polymer does not contain a base object in itself, but reacts with a resist or the matter in atmospheric air, and does not generate a base object.
- 15] In addition, as for the thickness of a protective coat 104, it is desirable to make it 300nm or less so that it may be fitted together with the thickness of the applied photoresist film in the depth of focus by which record light was condensed in the next record process. By the protective coat 104, the photoresist film 103 is isolated from an external ambient atmosphere, and it prevents the base object in an ambient atmosphere invading into the photoresist film 103.
- 16] Moreover, the silicon dioxide using the transparency isolation layer 102 is the covalent-bond object of oxygen and silicon, excluding a base, reacts with a photoresist and its thinner, and does not generate a base object. Therefore, it prevents the base object in the soda glass base material 101 spreading and invading into the photoresist film 103.
- 17] Moreover, as for the thickness of the transparency isolation layer 102, it is desirable to set up in consideration of the refractive index of the soda glass base material 101 to the record wavelength in a next record process, the refractive index of a protective coat and each photoresist, and thickness, so that the reflection factor of record light may become small.
- 18] Next, as a record process, it lets a protective coat 103 pass, and it condenses with an objective lens 105 and the ultraviolet-rays laser (wavelength of 248nm) using the 2nd higher harmonic of the Ar ion laser modulated or reflected according to the signal which should be recorded is exposed. In addition, it is desirable to heat-treat again, to fuse the proton in a photoresist, and to make concentration distribution into homogeneity in front of a record process.
- 19] The alkali solubilization reaction of a photoresist is promoted by making the generated proton into a catalyst as

ting down stream processing after a record process. Next, pure water is poured as a protective coat removal process, rotating a base material, and dissolution removal of the water-soluble protective coat is carried out. And after dissolving exposure section 106 with an alkaline developer, removing, rinsing with pure water again and flushing a developer in a development process, rotating a base material, information record-medium original recording with a pit pattern is produced by making it rotate and making it shake off and dry.

20] In addition, with the gestalt of this operation, although the silicon dioxide was used as an ingredient of a transparency isolation layer, if the inorganic material of non-basicity covalent-bond objects, such as an aluminum oxide, reacts with a photoresist and thinner and does not generate a base object, it can use as an ingredient of a transparency isolation layer, and the same effectiveness can be acquired. Moreover, effectiveness with the same said of an organic polymer (for example, AR2 made from SHIPUREI) of the nonaqueous solubility ingredient which reacts with a photoresist and thinner and does not generate a base object can be acquired.

21] Effect of the Invention] According to the information record-medium original recording production approach of this invention, even if it uses a chemistry magnification mold photoresist, it can prevent that a base object invades and carries out deactivation to a photoresist from a base material. Consequently, dispersion in the configuration for every original recording is suppressed, dispersion in the configuration within each original recording is also suppressed, and stable information record-medium original recording can be produced.

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Figure 1]

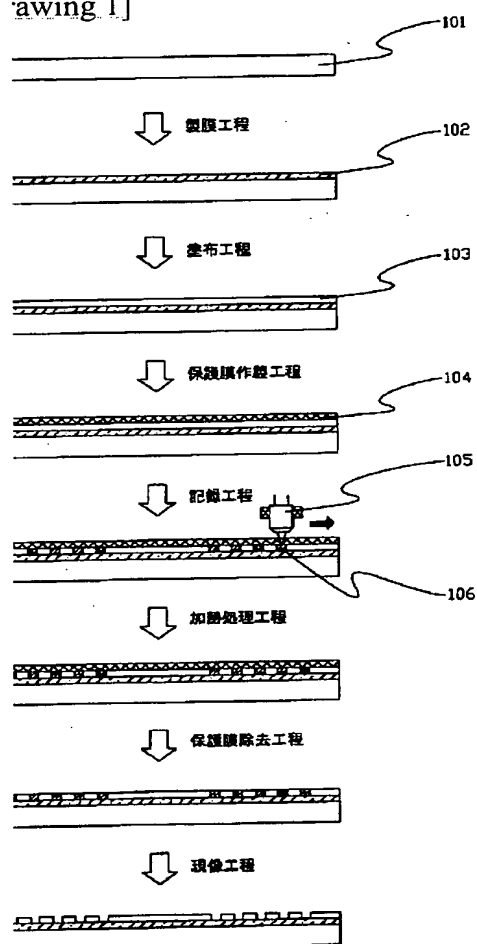
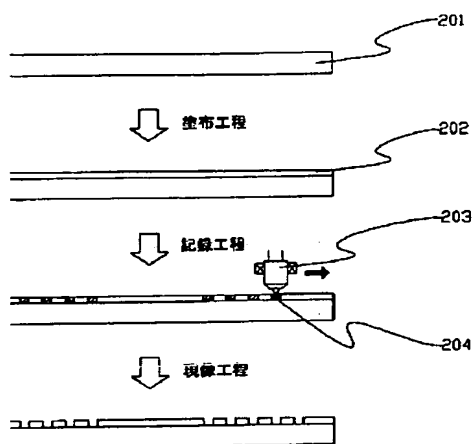


Figure 2]



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(71) 出願人 000004237

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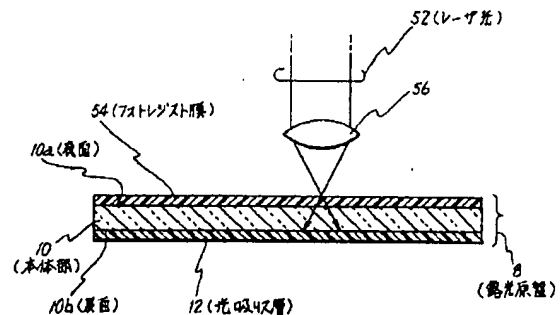
(74) 代理人 弁理士 高橋 勇

(54) 【発明の名称】 光ディスクマスタリング用露光原盤

(57) 【要約】

【目的】 フォトリソグ膜をレーザー光で露光する際のコントラストを向上させる。

【構成】 本発明に係る露光原盤8は、ガラス材質から成る本体部10と、本体部10の表面10aに被着されると共にレーザー光52で露光されるフォトリソグ膜54と、本体部10の裏面10bに被着されると共にレーザー光52を吸収する光吸収膜12とを備えている。レーザー光52は、本体部10の表面10aのフォトリソグ膜54を露光した後、その一部が本体部10中を透過し、本体部10の裏面10bの光吸収膜12に到達する。光吸収膜12は、本体部10中を透過したレーザー光52を吸収する。したがって、本体部10中を透過したレーザー光52が本体部10の裏面10bで反射したり、本体部10の裏面10bを透過して再び入射したりすることが抑えられる。



【特許請求の範囲】

【請求項1】 ガラス材質から成る本体部と、この本体部の表面に被着されると共にレーザ光で露光されるフォトリソ膜とを備えた光ディスクマスタリング用露光原盤において、

前記本体部の裏面に被着されると共に前記レーザ光を吸収する光吸収膜を備えたことを特徴とする光ディスクマスタリング用露光原盤。

【請求項2】 ガラス材質から成る本体部と、この本体部の表面に被着されると共にレーザ光で露光されるフォトリソ膜とを備えた光ディスクマスタリング用露光原盤において、

前記本体部の裏面に被着されると共に前記レーザ光及び熱を吸収する光熱吸収膜を備えたことを特徴とする光ディスクマスタリング用露光原盤。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、光ディスクを大量複製する際の前記原盤となるニッケルスタンパーを製作するための光ディスクマスタリング用露光原盤（以下、単に「露光原盤」という。）に関する。

【0002】

【従来の技術】 図2は、従来の露光原盤を示す断面図である。

【0003】 露光原盤48は、ガラス材質から成る本体部50と、本体部50の表面50aに被着されると共にレーザ光52で露光されるフォトリソ膜54とを備えたものである。フォトリソ膜54は、本体部50の表面50aに、数十から数百nmの厚さで塗布されたものである。そして、フォトリソ膜54を、高い開口数NAを持つ集光レンズ56で絞られた近紫外域のレーザ光52でピット露光をし、現像後パターンを形成する。

【0004】

【発明が解決しようとする課題】 しかしながら、フォトリソ膜54を透過したレーザ光52の一部が本体部50の裏面50bで反射され、多重干渉光58となり、フォトリソ膜54の未露光部54c、54dを感光させてしまう場合がある（ハレーション効果）。また、本体部50の裏面50bを透過したレーザ光52の一部が、露光原盤48を乗せるターンテーブル（図示せず）で反射して、再び本体部50の裏面50bから入射する場合がある。この場合は、ターンテーブルの形状を反映したパターンがフォトリソ膜54に露光されてしま

【0005】 このように、従来の露光原盤48では、次のような問題があった。すなわち、結果的にコントラストの悪いパターンが形成されてしまう。特に高密度のパターンの露光を行う際には、コントラストの低下が著しくなる。

【0006】

【発明の目的】 そこで、本発明の目的は、フォトリソ膜をレーザ光で露光する際のコントラストを向上させた露光原盤を提供することにある。

【0007】

【課題を解決するための手段】 本発明は、上記目的を達成するためになされたものであり、ガラス材質から成る本体部と、この本体部の表面に被着されると共にレーザ光で露光されるフォトリソ膜とを備えた露光原盤を改良したものである。

【0008】 その改良した点とは、前記本体部の裏面に被着されると共に前記レーザ光を吸収する光吸収膜を備えたことである。また、この光吸収膜の代わりに、前記レーザ光及び熱を吸収する光熱吸収膜を備えたものとしてもよい。

【0009】

【作用】 レーザ光は、本体部表面のフォトリソ膜を露光した後、その一部が本体部中を透過し、本体部裏面の光吸収膜に到達する。この光吸収膜は、本体部中を透過したレーザ光を吸収する。したがって、本体部中を透過したレーザ光が本体部裏面で反射したり、本体部裏面を透過して再び入射したりすることが抑えられる。

【0010】

【実施例】 図1は、本発明に係る露光原盤の一実施例を示す断面図である。以下、この図面に基づき本実施例について説明する。ただし、図2と同一部分には同一符号を付し説明を省略する。なお、図示の都合上、フォトリソ膜54及び光吸収膜12は、本体部10に比べて拡大して示している。

【0011】 本発明に係る露光原盤8は、ガラス材質から成る本体部10と、本体部10の表面10aに被着されると共にレーザ光52で露光されるフォトリソ膜54と、本体部10の裏面10bに被着されると共にレーザ光52を吸収する光吸収膜12とを備えている。

【0012】 本体部10は、洗浄済のHOYA株式会社製ガラス基盤を用いた。光吸収膜12は、本体部10の裏面10bに黒鉛を含む塗料を10nm以上の厚さで一様に塗布することにより形成した。この黒鉛を含む塗料は、波長域300nm から500nm までのレーザ光52に対しての光の吸収率が60%以上あるものである。フォトリソ膜54は、本体部10の表面10aにシプレーファーマー社製ポジ型フォトリソ 9600シリーズ又は東京応化株式会社製ポジ型フォトリソ TSMR8800シリーズをスピン塗布法で100nm 程度塗布し、窒素雰囲気中でアニールすることにより形成した。

【0013】 この露光原盤8を日本レーザ株式会社製MR Y-1MCN光ディスク露光装置で露光した。その結果、集光レンズ56で絞られて本体部10を透過したレーザ光52は、光吸収膜12で十分に吸収された。したがって、従来フォトリソ膜54上に生じていたターンテーブ

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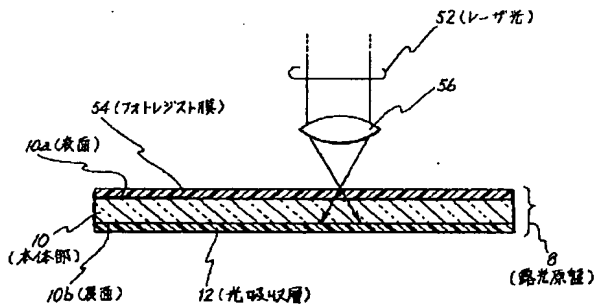
ルの形状を反映した縞模様がなくなり、ハレーションも減少してコントラストの良いパターンを形成する事ができた。

【0014】なお、光吸収膜12としての黒鉛を含む塗料は、熱を吸収する性質も有するので、光熱吸収膜としても機能する。この場合、フォトリソスト膜をレーザー光で露光する際の、熱の影響を軽減できる。

【0015】

【発明の効果】本発明に係る露光原盤によれば、本体部裏面に光吸収膜を被着させたので、本体部中を透過したレーザー光を光吸収膜で吸収できる。したがって、本体部中を透過したレーザー光が本体部裏面で反射したり、本体部裏面を透過して再び入射したりすることを防止できる

【図1】



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ことにより、フォトリソスト膜をレーザー光で露光する際のコントラストを向上できる。

【図面の簡単な説明】

【図1】本発明の一実施例を示す断面図である。

【図2】従来の一例を示す断面図である。

【符号の説明】

8 露光原盤

10 本体部

10 a 本体部の表面

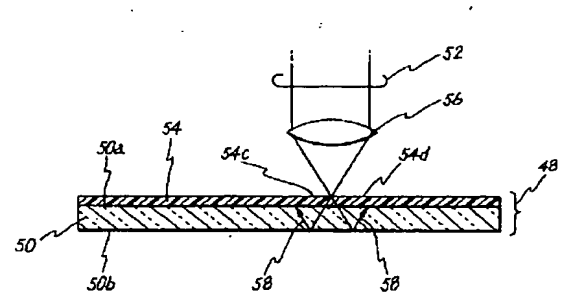
10 b 本体部の裏面

12 光吸収膜

52 レーザ光

54 フォトリソスト膜

【図2】



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